



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,955	01/23/2006	Masato Kurihara	126435	3082
25944 7590 07/01/2010 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
LI, JUN				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
07/01/2010		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com
jarnstrong@oliff.com

Office Action Summary**Application No.**

10/561,955

Applicant(s)

KURIHARA ET AL.

Examiner

JUN LI

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 9-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/22)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date: _____

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/03/2010 has been entered.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claim 1-4 and 6-8, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara (JP2000-223121) in view of Sugano (JP2002-083595).

Kurihara teaches a carbon material for an electrode having a specific surface area of 0.1-900 m²/g formed by thermal plasma-treating raw material powder (abstract, claim 1, 6, ([0001], [0031]).

Regarding claim 1 and 2, Kurihara fails to expressly teaching adding a sulfur compound into the carbon material by using a gas atmosphere including a sulfur-containing compound.

Sugano teaches adding sulfur for manufacturing carbon material for nonaqueous solvent secondary battery electrodes because sulfur addition can increase the degree of

graphitization, high service capacity and high charge and discharge efficiency ([0012]) wherein 5% weight of sulfur was used ([0017]).

It would have been obvious to one ordinary skill in the art to adopt the addition of sulfur as taught by Sugano to improve the carbon material for electrode of Kurihara. One of ordinary skill in the art would have been motivated to provide a sulfur-containing compound to the gas atmosphere during plasma-treating because sulfur addition can increase the carbon material graphitization degree, high service capacity and high charge and discharge of the carbon material for electrode as taught by Sugano([0012]).

It is to be noted that the recited surface area in the instant application is overlapping with the prior art, thus a prima facie case of obviousness exists (See § MPEP 2144.05 [R-5] I).

As for the sulfur being introduced into a surface of the electrode carbon material, it is noted that instant claims recite a product while "sulfur being introduced onto a surface of the carbon material" is just a process limitation which resulted from the thermal plasma treating of the carbon and sulfur material and only lead to presence of sulfur in the carbon electrode material in light of the instant specification ([0013]). Kurihara already reaches a substantially similar thermal plasma process for treating carbon material with associated surface treatment capability ([0031]) while Sugano teaches addition of sulfur will provide benefits of increasing the carbon material graphitization degree, high service capacity and high charge and discharge of the carbon material for electrode ([0012]). Thus the combination of Kurihara and Sugano expects a substantially similar carbon electrode compound with sulfur presented

thereof. Furthermore, Sugano teaches mixing carbon material with sulfur, it is obvious that at least part of sulfur will be introduced onto the surface of the carbon material absent evidence to the contrary.

It is noted that even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (See § MPEP 2133 [R-1], *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966, Fed. Cir. 1985). Furthermore, there is no evidence and data linked that the recited raw material in the instant claim provides a distinct structure for the compound over the applied prior art disclosed compound.

Regarding claim 3 and 4, Kurihara further teaches carbon material such as graphite, acetylene black and Ketchen black etc can be used together with metallic sulfide to make carbon materials for positive electrode materials (anode) ([0057], [0043]) while an electrode comprising paint for negative electrode (cathode) including an improved coal raw material, which indicates carbon material can be both used as an anode and cathode.

As for the sulfur content, Sugano further teaches mixing 0.1-100 weight of sulfur to pitch (carbon) mixture 100 weight section, wherein the sulfur content based on the total amount of carbon is overlapping with the recited ranges in the instant claims, thus renders a prima facie case of obviousness (See MPEP §2144.05 [R-5] II).

It would have been obvious for one of ordinary skill in the art at the time of invention filed to adopt a proper sulfur content as shown by Sugano to modify the carbon material of Kurihara because addition of sulfur will affect the carbon material and its related electrode properties thus it would have been obvious to one of ordinary skill in the art to have optimized the amount of sulfur for a desired carbon material and a desired electrode from such carbon material (See MPEP §2144.05 [R-5] II).

Regarding claim 6, Kurihara further teaches an electrode comprising a paint for negative electrode including an improved coal raw material and a binder ([0052]) which are then painted on a charge collector which made from aluminum, copper, nickel, titanium etc ([0053], [0054]).

Regarding claim 7 and 8, Kurihara further teaches the lithium secondary battery can include an anode, a negative electrode (cathode) ([0055], [0061]) while different nonaqueous solvent for electrolysis solution ([0059]) while the structure of the lithium secondary battery is not limited ([0061]). As for the recited electrolyte layer arranged between the anode and cathode is an obvious arrangement for one ordinary skill in the art.

Regarding claim 16 and 17, Kurihara in view of Sugano is silent about the sulfur is in a gas state and sulfur containing compound is SF_6 . However, using sulfur in gas state or using SF_6 as sulfur containing compound only lead to incorporating sulfur in the carbon material in light of the instant specification ([0041]). Kurihara in view of Sugano already expects a substantially similar carbon electrode material with presence of sulfur as discussed above. Furthermore, there is no evidence or data showing that using such

gas state sulfur or SF_6 will lead to a carbon electrode material with sulfur having a different/distinct structure over the applied references.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara (JP2000-223121) in view of Sugano (JP2002-083595) as applied above, and further in view of Takami (US5340670).

The references of Kurihara in view of Sugano fail to expressly teach the carbon material capable of inserting and desorbing lithium ion.

Takami teaches a carbon material for lithium secondary battery is capable of absorbing and desorbing lithium ion to suppress the reaction between lithium and the nonaqueous electrolyte thus prevent precipitation of lithium dendrites (column 1 lines 61- column line2).

It would have been obvious to one ordinary skill in the art to adopt the lithium ion absorbing and desorbing capability of carbon material as taught by Takami to improve the carbon material for electrode of Kurihara in view of Sugano. One of ordinary skill in the art would have appreciated to do so because lithium ion absorbing and desorbing capability can suppress the reaction between lithium and the nonaqueous electrolyte thus prevent precipitation of lithium dendrites as taught by Takami (column 1 lines 61- column line2). Furthermore, adopting known technique to improve efficiency of similar method is well within the scope of one ordinary skill in the art.

3. Claim 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara (JP2000-223121) in view of Sugano (JP2002-083595) as applied

above, and further in view of Paul et al (Plasma Sources Sci Technol., 2000, 9;304-314).

In arguendo about Kurihara in view of Sugano not teaching using SF₆ (a gas state sulfur compound) during the carbon electrode material producing process.

Kurihara further teaches different plasma gases such as nitrogen etc ([0035], [0036]) for producing carbon electrode material.

Paul teaches mixture of SF₆ and N₂ or pure SF₆ or pure N₂ plasma can be used in thermal plasma for materials processing (page 304 left column last para-right column first para., page 305 Table 1, first para. under Table 1, page 312 conclusion section).

It would have been obvious for one of ordinary skill in the art at the time of invention filed to adopt such SF₆ thermal plasma as shown by Paul to modify the carbon sulfur electrode material process of Kurihara in view of Sugano because by doing so cannot only expand the choices of plasma gas but also provides sources of sulfur from SF₆ as suggested by Paul (page 304 left column last para-right column first para., page 305 Table 1, first para. under Table 1, page 312 conclusion section).

Response to Arguments

Applicant's arguments filed on 06/03/2010 have been fully considered but they are not persuasive. In response to applicant's arguments about Kurihara and Sugano discloses different processes for treating carbon electrode material wherein Kurihara using thermal plasma while Sugano using high temperature heat treatment, it is noted

that both references are directed to high temperature treating carbon material for producing a desired carbon electrode material. Furthermore, Sugano discloses benefits of using sulfur to modify the carbon material as discussed above. Thus one of ordinary skill in the art would have been motivated to use such sulfur compound to modify the carbon material producing process of Kurihara for producing a sulfur modified carbon electrode material with such benefits. Thus a substantially similar sulfur modified carbon electrode material is expected from Kurihara in view of Sugano, which meets the claimed product in the instant claims. As for the recited process limitation steps, it is noted that even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (See § MPEP 2133 [R-1], *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966, Fed. Cir. 1985). Furthermore, there is no evidence and data linked that the recited raw material in the instant claim provides a distinct structure for the compound over the applied prior art disclosed compound. While for the newly recited limitations of using sulfur in gas state or using SF₆ as sulfur containing compound, introducing sulfur onto the surface of the carbon material, there is no data/evidence about such limitation will provide a distinct structure for the claimed product in the instant application. Furthermore, it is also well known in the art that SF₆ can be used in thermal plasma process (as shown by

Paul et al) for material processing and such SF₆ thermal plasma can provide sulfur species during such thermal plasma process as discussed above.

In summary, the claimed subject matter is not patentable distinct over the applied references unless there will have data/evidence to demonstrate that such material have a distinct structure over the product as disclosed by the references.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUN LI whose telephone number is (571)270-5858. The examiner can normally be reached on Monday-Friday, 8:00am-5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JUN LI/
Examiner, Art Unit 1793
06/24/2010

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793